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Author Submission

Conference: **X-Ray and Gamma-Ray Instrumentation for Astronomy XI (AM125)**

Chairs: **Kathryn A. Flanagan
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Submitted: 3 February

Title:

Laboratory Astrophysics using a Spare XRS Microcalorimeter

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Abstract:

The XRS instrument on Astro-E is a fully self-contained microcalorimeter x-ray instrument capable of acquiring, optimally filtering, and characterizing events for 32 independent pixels. With the launch of the Astro-E spacecraft, a full flight spare detector system has been integrated into a laboratory cryostat for use on the electron beam ion trap (EBIT) at Lawrence Livermore National Laboratory. The detector system contains a microcalorimeter array with 32 instrumented pixels heat sunk to 60 mK using an adiabatic demagnetization refrigerator. The instrument has a composite resolution of 8eV at 1 keV and 12eV at 6 keV with a minimum of 95% quantum efficiency. This will allow high spectral resolution, broadband observations of collisionally excited plasmas which are produced in the EBIT experiment. Unique to our instrument are exceptionally well characterized 1000 Angstrom thick aluminum on polyimide infrared blocking filters. The detailed transmission function including the edge fine structure of these filters has been measured in our laboratory using an erect field grating spectrometer. This will allow the instrument to perform the first broadband absolute flux measurements with the EBIT instrument. The instrument performance as well as the results of preliminary measurements will be discussed. Work performed under the auspices of the U.S. D.o.E. by Lawrence Livermore National Laboratory under contract W-7405-ENG-48 and was supported by the NASA High Energy Astrophysics Supporting Research and Technology Program.

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F. Scott Porter graduated in 1987 with a B.S. in physics from Harvey Mudd College and an SciM. and PhD in 1993 from Brown University. He did post-doctoral research in cryogenic x-ray detectors at NRL and NASA/GSFC. He is currently a staff scientist in the X-ray Astrophysics branch at NASA/GSFC developing cryogenic x-ray instruments and investigating the origin of the soft x-ray background. He played a major role in the development of the XRS instrument on Astro-E.

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